What are the important properties of the De Broglie's waves?

Bezverkhniy Volodymyr Dmytrovych, Bezverkhniy Vitaliy Volodymyrovich.
Ukraine, e-mail: bezvold@ukr.net

De Broglie waves are quantum mechanics. In his best! For example, you can show how de Broglie waves form time in our world. Or, for example, how the same de Broglie waves (microparticles) transmit information at a speed greater than the speed of light in a vacuum. I'm not even talking about gravity at the quantum level, or about the covalent chemical bond between atoms, as well as entangled state. All this is easily explained by the long-familiar de Broglie waves. Moreover, without additional assumptions and hypotheses. The usual wave mechanics :). It is also easy to show that the conclusions drawn in this way are absolutely consistent with A. Einstein's theory of relativity. More precisely, their results are completely equivalent (time dilation, length change, etc.). But, to begin with, we will show how de Broglie waves transfer information.

Everything is very simple. Let's do a thought experiment as A. Einstein did. Let's learn from him. So, let's say the electron moves with a speed v relative to the frame of reference 1. Moreover, the electron is in one galaxy A, and the frame of reference 1 is in galaxy B. And the distance between them is quite large (millions or billions of light years). When an electron moves at a speed v, a wave of matter, that is, a de Broglie wave, will be associated with the electron. The length of this wave will be:

$$\lambda = h / (m * v)$$

where λ - de Broglie wavelength,

v - electron speed,

m - is the electron mass.

The de Broglie wave speed will be:

$$Vf = c^2 / v$$

where c - is the speed of light in vacuum,

v - is the speed of the electron as a corpuscle,

Vf - is the phase velocity of the de Broglie waves.

Thus, the speed of de Broglie waves in general form will be equal to:

$$Vf = c^2/v = (c^2/h) * m * \lambda$$

That is, the greater the distance from the electron to the frame of reference 1, the larger the de Broglie wave itself, and the greater its phase velocity. And this speed will always be greater than the speed of light in a vacuum. At large distances between galaxies, this speed will be truly enormous. But, the propagation time of de Broglie waves will be negligible. Remember the confused state?

Another thing is interesting here: since the phase velocity of the de Broglie waves is determined by the speed of the electron (Vf = c^2 / v), the experimental fixation of the velocity of the de Broglie wave in the reference frame 1 (in galaxy B) will make it possible to unambiguously determine the speed of the electron in galaxy A. This means that the de Broglie wave carries information about the motion of a real microparticle. Moreover, the transfer of information is carried out with lightning speed even between galaxies at different ends of our Universe (due to the speed of de Broglie waves). Here is the explanation for the "eerie long-range action": distant particles exchange de Broglie waves. This is enough for instant interaction between particles. Even on the scale of the visible Universe. Explaining the "birth of time" and how quantum gravity works is similar and also elementary. But, more on that another time...

1. Quora: What are the important properties of the De Broglie's waves? https://qr.ae/pNuB0L